Mr. Gary J. Pierre
Pierre Funeral Home, Inc.
2601 West Franklin Street
Evansville, Indiana 47712

Dear Mr. Pierre:

Re: Exempt Construction and Operation Status,
163-14762-00155

The application from Pierre Funeral Home, Inc., received on August 14, 2001, has been reviewed. Based on the data submitted and the provisions in 326 IAC 2-1.1-3, it has been determined that the following equipment to be located at 2601 West Franklin Street, Evansville, Indiana 47712, is classified as exempt from air pollution permit requirements:

(a) one (1) crematory incinerator for human remains, with a maximum capacity of 100 pounds per hour, supplemented by natural gas or LPG fuel at a rate of 1.7 million British Thermal Units per hour (mmBtu/hr).

The following conditions shall be applicable:

(1) Opacity Limitations [326 IAC 5-1-2]
Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this permit:

(a) Opacity shall not exceed an average of thirty percent (30%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity) monitor in a six (6) hour period.

(2) Incinerators [326 IAC 4-2-2]
Pursuant to 326 IAC 4-2-2 , the proposed crematory incinerator shall:

(a) Consists of primary and secondary chambers or the equivalent;
(b) Be equipped with a primary burner unless burning wood products;
(c) Comply with 326 IAC 5-1 and 326 IAC 2;
(d) Be maintained properly as specified by the manufacturer and approved by the commissioner;
(e) Be operated according to the manufacturer recommendations and only burn waste approved by the commissioner;
(f) Comply with other state and/or local rules or ordinances regarding installation and operation of incinerators;
(g) Be operated so that emissions of hazardous material including, but not limited to, viable pathogenic bacteria, dangerous chemicals or gases, or noxious odors are prevented;
(h) Not emit particulate matter in excess of:

(1) five-tenths (0.5) pounds of particulate matter per one thousand (1,000) pounds of dry exhaust gas at standard conditions corrected to fifty percent (50%) excess air; and

(i) Not create nuisance or a fire hazard.

If any of the above result, the burning shall be terminated immediately.

This exemption is the first air approval issued to this source.

An application or notification shall be submitted in accordance with 326 IAC 2 to the Office of Air Quality (OAQ) if the source proposes to construct new emission units, modify existing emission units, or otherwise modify the source.

Sincerely,

Paul Dubenetzky, Chief
Permits Branch
Office of Air Quality

APD

cc: File - Vanderburgh County
Vanderburgh County Health Department
Air Compliance - Scott Anslinger
Southwest Regional Office
Permit Tracking - Janet Mobley
Technical Support and Modeling - Michele Boner
Compliance Data Section - Karen Nowak
Evansville, EPA

Indiana Department of Environmental Management
Office of Air Quality

Technical Support Document (TSD) for an Exemption

Source Background and Description

Source Name:	Pierre Funeral Home, Inc.
Source Location:	2601 West Franklin Street, Evansville, Indiana 47712
County:	Vanderburgh
Exemption No.:	163-14762-00155
SIC Code:	7261
Permit Reviewer:	Aida De Guzman

The Office of Air Quality (OAQ) has reviewed an application from Pierre Funeral Home, Inc. relating to the construction and operation of the following equipment to be located at 2601 West Franklin Street, Evansville, Indiana 47712:

(a) one (1) crematory incinerator for human remains, with a maximum capacity of 100 pounds per hour, supplemented by natural gas or LPG fuel at a rate of 1.7 million British Thermal Units per hour (mmBtu/hr).

Stack Summary

Stack ID	Operation	Height (feet)	Diameter (feet)	Flow Rate (acfm)	Temperature (^{0}F)
#1	Incinerator	34	1.7	2,200	1000

Recommendation

The staff recommends to the Commissioner that the construction and operation be approved. This recommendation is based on the following facts and conditions:

Information, unless otherwise stated, used in this review was derived from the application and additional information submitted by the applicant.

An application for the purposes of this review was received on August 14, 2001.

Emissions Calculations

(a) Incinerator Supplemental Natural Gas or LPG Fuel Combustion: See Page 1 of 1 TSD Appendix A of this document for detailed emissions calculations.

1. Human (Type IV waste) Cremation (IEEC unit) Emissions :

The following Emission factors were taken from the EPA website, which were the results of stack testing from a similar human crematory incinerator supplied by Industrial Equipment and Engineering Company (IEEC). The test done was for a larger unit, Ener-Tek IE43-ET incinerator, with a capacity of 250 pounds per hour (lb/hr).

Crematory Stack Testing Results (Ener-Tek IE43-ET @ 250 lb/hr)	
Nitrogen Oxides (NOx)	30.1 ppm
Volatile organic Compounds (VOC)	0.5 ppm
Particulate	0.026 gr/dscf @ 7% O2
Hydrochloric Acid	0.0235 lb/hr

Proposed IEEC Incinerator Emissions:

(1) Nitrogen Oxide (NOx):

Proposed incinerator capacity - 100 lb/hr
Stack Tested Ener-Tek IE43-ET incinerator capacity - 250

Emission rate for Ener-Tek based on the stack test results:
(30 ppm * 640 dscm * 60 min/hr * 0.0283 m^3/ft^3
* 1.88 mg/m^3/ppmv) / (453,600 mg/lb) = 0.136 lbs/hr

Proposed IEEC incinerator NOx emissions = $\frac{100 \text{ lb/hr}}{250 \text{ lb/hr}} * 0.136$ lbs/hr

= 0.0544 lbs NOx/hr
= 0.0544 lbs NOx/hr * ton/2000 lb * 8760 hr/yr
= 0.24 ton NOx/yr

(2) Volatile Organic Compounds (VOC):

Emission rate for Ener-Tek based on the stack test results:
(0.5 ppmv * 640 dscf * 60 min/hr * 0.0283 m^3/ft^3
* 0.65 mg/m^3/ppmv) / (453,600 mg/lb) = 0.001 lb/hr

Proposed IEEC incinerator VOC emissions = $\frac{100 \text{ lb/hr}}{250 \text{ lb/hr}} * 0.001$ lb/hr
= 0.0004 lb/hr
= 0.0004 lb/hr * ton/2000lb * 8760 hr/yr
= 0.002 ton VOC/yr

(3) Sulfur Dioxide (SO2):

Using AP-42 Emission factor, table 2.1-12 (2.5 lb/ton)

Proposed IEEC incinerator SO2 emissions = 100 lb/hr * 2.5 lb/ton * ton/2000 lb * 8760 hr/yr * ton/2000 lb
= 0.55 ton/ SO2yr

(4) Carbon Monoxide (CO):

Power-Pak II crematory with a capacity of 125 lb/hr was also stack tested for CO. The CO emissions from the test is 0.007 lb/hr.

Proposed IEEC incinerator CO emissions = $\frac{100 \text{ lb/hr}}{125 \text{ lb/hr}} * 0.007$ lb/hr

= 0.006 lb/hr
= 0.006 lb/hr * 8760 hr/yr * ton/200 lb
= 0.026 ton CO/yr

(5) Particulate Matter Emissions:
PM/PM10 Emission rate for Ener-Tek based on the stack test results = 0.026 gr/dscf @ 7% O_2

= 0.103 lb/hr

Proposed IEEC incinerator PM/PM10 emissions = $\frac{100 \text{ lb/hr}}{250 \text{ lb/hr}} * 0.103$ lb/hr
= 0.04 lb/hr
= 0.04 lb/hr * 8760 hr/yr * ton/200 lb
= 0.18 ton PM/PM10/yr

(6) HAP (HCL) Emissions:
Small amount of hydrochloric acid (HCL) is emitted that is coming from the containers used to hold the remains.
HCL Emission rate for Ener-Tek based on the stack test results = 0.0235 lb/hr

Proposed IEEC incinerator HCL Emission = $\frac{100 \text{ lb/hr}}{250 \text{ lb/hr}} * 0.0235$ lb/hr
= 0.009 lb/hr
= 0.009 lb/hr * 8760 hr/yr * ton/2000 lb
= 0.04 ton HCL/yr

Potential To Emit

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as "the maximum capacity of a stationary source or emissions unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA, the department, or the appropriate local air pollution control agency."

Pollutant	Potential To Emit (tons/year)
PM	0.18 **
PM-10	0.28
SO_2	0.55
VOC	0.002
NOx	1.74 *
CO	0.626 **

Note: * - LPG which has worse emissions than natural gas was considered.
** - natural gas which has worse emissions than LPG in this case was considered.

HAP's	Potential To Emit (tons/year)
Hydrochloric Acid	0.04
TOTAL	0.04

Justification for the Level of Approval

The new source is subject to 326 IAC 2-5.1-1(a)(1) since it meets the criteria for an exemption

under 326 IAC 2-1.1-3 or since it is not required to obtain a registration or permit under this rule because its NOx potential to emit is less than ten (10) tons per year.

County Attainment Status

The source is located in Vanderburgh County.

Pollutant	Status
PM-10	attainment
SO_2	attainment
NO_2	attainment
Ozone	maintenance
Lead	not determined

(a) Volatile organic compounds (VOC) and oxides of nitrogen (NOx) are precursors for the formation of ozone. Therefore, VOC emissions are considered when evaluating the rule applicability relating to the ozone standards. Vanderburgh County has been designated as maintenance for ozone. Therefore, VOC and NOx emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

(b) Vanderburgh County has been classified as attainment or unclassifiable for all the other criteria pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

Source Status

New Source PSD Definition (emissions after controls, based on 8,760 hours of operation per year at rated capacity):

Pollutant	Potential To Emit (tons/year)
PM	0.18 **
PM-10	0.28
SO_2	0.55
VOC	0.002
NOx	1.74 *
CO	0.626 **

Note: * - LPG which has worse emissions than natural gas was considered.
** - natural gas which has worse emissions than LPG in this case was considered.

HAP's	Potential To Emit (tons/year)
Hydrochloric Acid	0.04
TOTAL	0.04

(a) This new source is **not** a major stationary source because no attainment pollutant is emitted at a rate of 250 tons per year or greater and it is not in one of the 28 listed source categories. Therefore, pursuant to 326 IAC 2-2, and 40 CFR 52.21, the PSD requirements do not apply.

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)
This new source is not subject to the Part 70 Permit requirements because the potential to emit (PTE) of:
(a) each criteria pollutant is less than 100 tons per year,
(b) a single hazardous air pollutant (HAP) is less than 10 tons per year, and

(c) any combination of HAPs is less than 25 tons/year.

This is the first air approval issued to this source.

Federal Rule Applicability

(a) 326 IAC 12 and 40 CFR 60 (New Source Performance Standard)
This incinerator is not subject to the New Source Performance Standard, 326 IAC 12, (40 CFR Part 60.50, Subpart (E)), because this incinerator has a charge capacity of 1.5 tons per day, which is less than 50 tons per day, the applicability threshold of this subpart.

(b) 326 IAC 14 and 40 CFR 61, and 63 (National Emission Standard For Hazardous Air Pollutants) . The incinerator is not subject to Emission Standard For Hazardous Air Pollutants, 326 IAC 14 and 40 CFR 61, and 63, as no hazardous air pollutants covered under these rules are emitted from this facility.

State Rule Applicability

(a) 326 IAC 2-6 (Emission Reporting)
This facility is not subject to 326 IAC 2-6 (Emission Reporting), because the source does not have the potential to emit more than 10 tons/yr of NOx.

(b) 326 IAC 4-2-2 (Incinerators)
This natural gas or LPG fired incinerator is subject 326 IAC 4-2-2 (Incinerators). Pursuant to 326 IAC 4-2-2, the particulate matter emissions shall be limited to 0.5 pounds per 1,000 pounds of dry exhaust gas at standard conditions corrected to fifty percent (50%) excess air.

Compliance with the PM emissions limit in 326 IAC 4-2-2:

PM emission limit	-	0.5 lb of PM/1000 pounds of dry exhaust gas at standard condition corrected to 50% excess air.
Flow rate of flue gas	=	2200 acfm
Temperature of the flue gas	=	1000 ^{0}F
Oxygen level in flue gas	=	10.6%
Nitrogen level in flue gas	=	82.1%
% Excess air	=	(% O_2 - 0.5% CO) * 100% / (0.264%N_2) - (% O_2 - 0.5% CO)
	=	(% O_2) * 100% / (0.264% N_2 - %O_2)
	=	(10.6) * 100% / (0.264% * 82.1% -10.6)
	=	96%
Correction factor for 50% excess air	=	(100 + %EA) / 150
	=	(100 + 96%) / 150
	=	1.3
Particulate matter per pound of flue gas	=	(0.083 lb PM/hr) / 2000 ft^3/min of flue gas
	=	0.00004 lb/hr
Density of flue gas	=	P/RT
R	=	54.5 ft lbf /lbm ^{0}R
P (density)	=	2117 lbf/ft^2) / (54.5 ft lbf/lbm ^{0}R / 1180 + 460 ^{0}R

= 0.024 lbm/ft^3

Particulate per pound of flue gas = (0.083 lb/hr) / (2000 ft^3/min) * (0.024 lbm/ft^3) * (60 min/hr)
= 5.9 x 10^{-5} lb particulate / lb flue gas

Particulate per 1,000 pounds of flue gas = 5.9 x 10^{-5} lb particulate / lb flue gas * 1000 lb of flue gas * 1.3
= 0.077 lbs < 0.5 lbs, therefore, this incinerator complies with the rule.

(c) 326 IAC 7-1.1-1 (Sulfur dioxide emission Limitations)
This natural gas or LPG fired incinerator is not subject to 326 IAC 7-1.1-1 (Sulfur dioxide emission Limitations), because the incinerator does not have the potential to emit twenty-five (25) tons of sulfur dioxide per year or have actual emissions of ten (10) pounds of sulfur dioxide per hour.

(d) 326 IAC 8-1-6 (general provisions relating to VOC rules- general reduction requirements for new facilities)
This natural gas or LPG fired incinerator is not subject to this rule, because the incinerator does not have the potential emissions of twenty-five (25) tons of VOC per year, and none of the article 8 rule apply to this incinerator.

(e) 326 IAC 9-1-1 (Carbon Monoxide emission Limits)
This natural gas or LPG fired incinerator burns the waste gas stream in a secondary chamber, which is equivalent to a direct-flame afterburner control. Therefore, this incinerator is in compliance with this rule.

(f) 326 IAC 10-1-1 (Nitrogen Oxides Rules)
This natural gas or LPG fired incinerator is not located in Clark and Floyd Counties, therefore, this rule does not apply to this incinerator.

Conclusion

The construction of this incinerator shall be subject to the conditions of the attached **Exemption 163-14762-00155.**

Appendix A: Emissions Calculations

Natural Gas Combustion Only

MM BTU/HR <100

1.7 mmBtu/hr human remains incinerator

Small Industrial Boiler

Company Name: Pierre Funeral Home, Inc.

Address City IN Zip: 2601 West Franklin St., Evansville, IN 47712

Exemption No.: 163-14762-00155

Reviewer: Aida De Guzman

Date Application Received: August 14, 2001

Heat Input Capacity MMBtu/hr	Potential Throughput MMCF/yr
1.7	14.9

	Pollutant					
	PM*	PM10*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	0.6	100.0 **see below	5.5	84.0
Potential Emission in tons/yr	0.0	0.1	0.0	0.7	0.0	0.6

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.

**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu

Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03

(SUPPLEMENT D 3/98)

Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

Note: Check the applicable rules and test methods for PM and PM10 when using the above emission factors to confirm that the correct factor is used (i.e., condensable included/not included).

See page 2 for HAPs emissions calculations.

Appendix A: Emission Calculations
LPG-Propane - Industrial Boilers
(Heat input capacity: > 10 MMBtu/hr and < 100 MMBtu/hr)

1.7 mmBtu/hr human remains incinerator

Company Name: Pierre Funeral Home, Inc.
Address City IN Zip: 2601 West Franklin St., Evansville, IN 47712
Exemption No.: 163-14762-00155
Reviewer: Aida De Guzman
Date: August 14, 2001

Heat Input Capacity MMBtu/hr	Potential Throughput kgals/year	SO2 Emission factor = 0.10 x S S = Sulfur Content = 0.18 grains/100ft^3
1.70	162.75	

	Pollutant					
	PM*	PM10*	SO2	NOx	VOC	CO
Emission Factor in lb/kgal	0.6	0.6	0.0 *(0.10S)*	19.0	0.5 **TOC value	3.2
Potential Emission in tons/yr	0.0	0.0	0.0	1.5	0.0	0.3

*PM emission factor is filterable PM only. PM10 emission factor is assumed to be the same as PM based on a footnote in Table 1.5-1, therefore PM10 is filterable only as well.
**The VOC value given is TOC. The methane emission factor is 0.2 lb/kgal.

Methodology

1 gallon of LPG has a heating value of 94,000 Btu
1 gallon of propane has a heating value of 91,500 Btu (use this to convert emission factors to an energy basis for propane)
(Source - AP-42 (Supplement B 10/96) page 1.5-1)
Potential Throughput (kgals/year) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1kgal per 1000 gallon x 1 gal per 0.0915 MMBt

Emission Factors are from AP42 (Supplement B 10/96), Table 1.5-1 (SCC #1-02-010-02)

Emission (tons/yr) = Throughput (kgals/yr) x Emission Factor (lb/kgal) / 2,000 lb/ton
Note: Check the applicable rules and test methods for PM and PM10 when using the above emission factors to confirm that the correct factor is used (i.e., condensable included/not included).